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Review of Ramey et al., Testing the taxonomic validity of Preble's Meadow Jumping Mouse
(*Zapus hudsonius preblei*)

Ramey et al. employ the appropriate methods, markers, evidence, and interpretation to convincingly argue that *Z. h. preblei* is not a valid subspecies, and should be synonymized under *Z. h. campestris*. I think that the ESU is an appropriate and useful genetic unit that should be employed by conservation agencies as well as phylogeographers. The study by Ramey et al. has several small editorial errors and reference omissions (e.g., Hafner et al. 1981 and Hafner 1997 are cited as Hafner 1981 and Hafner 1987 in the second paragraph), and the tone is unnecessarily ponderous, condescending, and preachy. However, I agree with all of the systematic and taxonomic conclusions, and would also encourage regulatory agencies to employ systematists to provide such systematic reviews wherever it is practicable. I think it's rather absurd to consider regulatory agencies to be responsible for supporting in-depth systematic studies of this sort for every taxon under consideration, but an accurate taxonomy a laudable goal.

There remain several confusing aspects to the mtDNA data, but none that would alter the overall systematic and taxonomic conclusions. Specifically, Ramey et al. list a locality in Kansas as "Macon Co."; there is no Macon Co. in Kansas (could it be Marion Co.?). On page 8 they state that two sequences from Clay Co. were more similar to *campestris* than to *pallidus*, and then say that "they" (these two plus one presumed *hudsonius* that turned out to be a *princeps*) were "presumed misidentified and thus not included." I understand why *princeps* that were clearly misidentified as *hudsonius* were not included, but isn't it more likely that either a *campestris* mtDNA clone somehow remained or has found its way into *pallidus*, or (even more likely) there was some cataloging (museum) or experimental (laboratory) error, and the Clay Co. specimens are actually from western South Dakota. Given the "Macon Co." error, that seems to me to be the best bet. By the way, the Clay Co. sequences were included in the Neighbor-joining tree, so from what were they excluded, the Table?

While I support the taxonomic interpretations of Ramey et al., I disagree strongly with their implied conclusion that synonymy with *campestris* automatically translates into conservation security for the geographically expanded taxon. Yes, the expanded subspecies is "more common and widespread than previously thought," but that does not necessarily mean that the new taxon is secure, or that this represents a "misallocation of scarce conservation resources to populations that are not genetically or ecologically unique." Here Ramey et al. went well beyond their data, and failed to consider the conservation status of *campestris*. It would have been quite simple for Ramey et al. to

consult the IUCN Status Survey and Conservation Action Plan for North American Rodents (Hafner et al. 1998; <http://www.iucn.org/themes/ssc/actionplans/northamericanrodents/5geo.pdf>). In the section on *Zapus hudsonius*, Hafner and Yensen (1998) consider *preblei* to be Endangered (EN): B1; B2c (IUCN Red List Category; IUCN 1994), but also consider *campestris* to be of concern: Vulnerable (VU): B1; B2c.

EN: B1; B2c = Endangered, facing a very high risk of extinction in the wild in the near future; extent of occurrence estimated to be less than 100 km², and estimates indicating: B1) severely fragmented; and B2c) Continuing decline, observed, inferred, or projected, in area, extent, and/or quality of habitat.

VU: B1; B2c = Vulnerable, facing a high risk of extinction in the wild in the medium-term future; extent of occurrence estimated to be less than 100 km², and estimates indicating: B1) severely fragmented; and B2c) Continuing decline, observed, inferred, or projected, in area, extent, and/or quality of habitat.

Overgrazing and loss of riparian habitat has been implicated as the major deleterious impact on populations of *campestris* in Wyoming, South Dakota, and Montana (Hafner and Yensen 1994). Thus, although the expanded *campestris* enjoys a larger geographic range, it (including populations previously assigned to *preblei*) is of conservation concern throughout its range.

Moreover, mapping of the populations studied by Ramey et al. (see my Fig. 1) puts their Neighbor-joining tree in a geographic context, and allows phylogeographic interpretation. Due to the closer similarity of mtDNA clones of *luteus* and *pallidus*, it is apparent that the expanded *campestris* diverged prior to the geographic isolation of *luteus* from *pallidus*, which itself probably was associated with drying of grasslands habitat during the Hysithermal (6000 yBP) following the Wisconsinan glaciation. Thus, *campestris* may have been isolated from the main distribution of *hudsonius* during the Wisconsinan full-glacial. In any event, Ramey et al. clearly indicate that *campestris* is genetically more distinct from *pallidus* than is *luteus*, and so deserves more consideration as a unique gene pool.

Twenty years ago, *Z. h. luteus* was not only believed to be *Z. princeps luteus*, but also was considered to be extinct from the Rio Grande Valley of New Mexico. More recently, *Z. h. preblei*

was considered to be on the verge of extinction. Conservation concern led to targeted fieldwork, which in turn led to the discovery of additional populations of *luteus* in the Rio Grande Valley and in southeastern Colorado, and of *preblei* along the eastern edge of the Rocky Mountains. In my opinion, *Z. h. luteus* is relatively secure and not currently threatened, but I believe that *Z. h. campestris* (including *preblei*) remains imperiled.

